DETAILED ACTION

Applicant's remarks and amendments, filed on April 04, 2011 have been carefully considered. Claims 1, 11, and 21 are currently amended. Thus claims 1-24 are pending review in this action.

New Grounds of Rejection:

Response to Amendment

1. The declaration under 37 CFR 1.132 filed April 4, 2011 is moot due to the new grounds of rejection put forth below as the arguments and information present in the declaration is drawn to the fact that Giorgini alone does not teach a sag resistant material being used to repair a defect. Examiner has applied new grounds of rejection now discussing Barth and Markush1-3 which further clarify examiner's position that sag resistant polyurethane compositions are known in the art and obvious to those having the ordinary skill in the art in view of Giorgini.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giorgini et al (USP No. 7,138,437) in view of Rhodes et al. (USP No. 4,295,259) as evidenced by Young et al. (USP No. 5,173,222) in further view of Barth et al. (USP No. 4,275,172) or Markusch1 et al. (USP No. 5,166,303) or Markusch2 et al. (USP No. 5,607,998) or Markusch3 et al. (USP No. 6,786,680).

5. Regarding claims 1, 11, and 21 Giorgini teaches a method for repairing structural members by using a polyurethane material **(polyurethane-urea – see column 5 lines 9-19)** to repair the structural members. **(See abstract).** Giorgini goes on to teach that

the structural members can be rail tie assemblies. **(See claims 9, 11, and column 8 lines 24-31)**. Furthermore, Giorgini teaches that a polyurethane mixture is applied to the rail tie void (defect). **(See claim 11 and column 8 lines 12-40)**. This defect would be on top side or upper surface of the rail tie. Giorgini goes on to teach the poly (urethane-urea) material comprises Part A which is a polyol component and part B which is an isocyanate component. **(See abstract)**. Giorgini goes on to teach that a polyamine gelling agent can be added to Part A. **(See column 3 lines 35-42)**. This composition (polyol/amine/isocyanate) is then filled into a defect (contoured). **(See column 8 lines 32-40)**. Moreover, the polyurethane material is cured to repair the rail tie. **(See column 2 lines 39-42 and example 8 in Column 11 line 64 to column 12 line 18)**. Finally, a sag resistant polymeric repaired article is produced which can withstand dynamic operating conditions, compressive loading, maintaining rail gauge of a railcar. **(See abstract disclosing the addition of strength enhancers that would give the repaired article excellent strength in order to prevent deformation during a train pass).**

a. Conventionally, rail seats are part of rail tie assemblies as they insulate the rail from the rail tie. **(See applicant's specification page 1 lines 9-12)**. Furthermore, rail seats can be made of polyurethane. It would have been obvious to apply the teachings of Giorgini to include the repair of the rail seat portion of the rail tie assembly as Giorgini stands for repairing polyurethane based components in a rail tie assembly. As the rail seats and rail tie (defects- see spike hole defects on rail ties as seen in Giorgini-abstract) are both repaired

using of polyurethane it would have been obvious for one having the ordinary skill in the art apply Giorgini's process to rail seats.

i. Although rail ties themselves are typically concrete, defects in these concrete rail ties such as spike holes are repaired using the process of Giorgini. **(See abstract)**. Polyurethane is added to repair the defects and it would have been obvious for one having the ordinary skill in the art to use polyurethane to fix other polymeric rail tie components such as a rail seats with the same polymeric material (polyurethane).

b. With respect to claims 1, 11, and 21 Giorgini does not expressly teach : (1) restoring the damaged rail seat by curing the polymeric material under ambient temperature and pressure conditions; (2) wherein the polyurethane material is to be used to cure defects in rail seats and (3) wherein the polymeric material is substantially sag resistant prior to application and .

c. However, Rhodes teaches a method of repairing (filling) defects (holes) in a railway tie. **(See Abstract)**. Rhodes teaches an In Situ method of plugging a railroad tie by adding polyurethane foam which is curable at outdoor ambient temperature and pressure to make a rigid repaired article. **(See claim 1)**.

d. Giorgini and Rhodes are analogous art because they are from the same field of endeavor which is repairing or altering a railroad tie assembly. At the time of the invention, it would have been obvious to one having the ordinary skill in the art, having the teachings of Giorgini and Rhodes before him ore her , to modify the teachings of Giorgini with the teachings of Rhodes for the benefit of repairing

the rail tie on site. The motivation would have been to eliminate the need to bring heating or pressuring equipment on site in order to repair the tie assembly. Therefore, it would have been obvious to combine Giorgini with Rhodes to repair the rail tie because one would have been motivated to fix the tie on site without the need to move heavy machinery.

e. With respect to claims 1, 11, and 21, the combination of Giorgini and Rhodes do not expressly teach wherein the polyurethane material is to be used to cure defects in rail seats.

f. However, with respect to claims 1, 11, and 21, Young provides motivation that one having the ordinary skill in the art would look to repair defects in a rail tie and rail seat with a similar repairing compound such as epoxy. Young discloses that rail tie assemblies and rail seats need to be restored to original specifications. **(See column 1 lines 50-54)**. Young further teaches that polyurethane can be used to insulate (be a seat) for the space between a rail and a rail tie. **(See column 1 lines 6-10)** Therefore, it would have been obvious to one having the ordinary skill in the art to apply similar repair compositions for rail tie assembly repair to rail seat repair in order to standardize the material needed to repair a rail system. Therefore, it would be obvious to use the teachings of Giorgini and Rhodes, in order to repair rail seats with a polyurethane composition.

g. With respect to claims 1, 11, and 21 Giorgini does not expressly teach wherein the polymeric material is substantially sag resistant prior to application.

h. Regarding claims 1, 11, and 21 Barth, Markusch1, Markusch2, and Markusch3 all teach that when repairing defects in an article (concrete or plastic) a non-sagging (sag resistant) material (polyurethane based) is used which can be cured at ambient conditions.

ii. See Barth → teaching that concrete can be patched using an inventive polyurethane composition. **(See column 21 lines 1-10)**. Barth goes onto teach that the polyurethane composition is sag resistant. **(See column 21 line 45, column 23 line 57, column 28 line 43, and column 28 line 54)**. Barth also teaches that the inventive composition is curable under ambient conditions. **(See column 34 lines 30-38)**.

iii. See Markusch1 → teaching that an inventive polyurethane composition can be used to repair cracks and voids. **(See column 1 lines 24-26 and column 2 lines 19-25)**. Markusch1 goes onto teach wherein the polyurethane composition is sag resistant. **(See abstract, column 1 lines 50-57, and column 3 lines 58-67)**. Markusch1 goes onto teach wherein the composition is curable at room temperature. **(See example in column 4 and table 1)**.

iv. See Markusch2 → teaching that an inventive polyurethane composition can be used to repair cracks and voids. **(See column 1 lines 40-51 and column 2 lines 56-67)**. Markusch1 goes onto teach wherein the polyurethane composition is sag resistant. **(See abstract and column 2 lines 56-67)**. Markusch2 goes onto teach wherein the composition is

curable at room temperature. **(See column 10 lines 43-52 and column 15 lines 32-38)**.

v. See Markusch3 → teaching that an inventive polyurethane composition can be used to repair cracks and voids. **(See abstract and column 4 lines 20-38)**. Markusch3 goes onto teach wherein the polyurethane composition is sag resistant. **(See abstract and column 4 lines 20-38)**. Markusch3 goes onto teach wherein the composition is curable at room temperature. **(See column 9 lines 54-65)**.

(1) As Giorgini, Barth, and Markusch1-3 all teach a polyurethane/urea compositions made by some combination of a polyol, amine, and a polyisocyanate and that composition has sag resistant properties. It would have been obvious to one having the ordinary skill in the art to use a sag resistant polyurethane material to repair defects in a concrete or plastic article, Since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious engineering choice. *In re Leshin, 125 USPQ 416*.

6. Regarding claims 2-3 and 12-13, Giorgini does not teach: (1) wherein the damage rail seat is restored without requiring the use of non-ambient heat and (2) wherein the damage rail seat is restored without requiring the use of non-ambient pressure.

i. However, Rhodes teaches wherein the polyurethane is curable at an outdoor ambient temperature and pressure. **(See claim 1)**.

j. It would have been obvious to one having the ordinary skill in the art that no additional means for applying heat and pressure need be applied to cure a polymeric material that is curable under ambient conditions.

7. Regarding claims 4-5 and 14-15, Giorgini teaches wherein the polyurethane composition has a gel time that can be less than 5 seconds. **(See column 3 lines 35-49)**.

8. Regarding claims 6 and 16, Giorgini does not explicitly teach wherein the Set Time of the polymeric material is sufficient for contouring the restored rail seat in situ without requiring the use of non-ambient heat.

k. However, Rhodes teaches wherein the repair method is In situ and at ambient pressure and temperature. **(See claim 1)**,

l. It would have been obvious to use an in situ repair process to minimize the need for addition machinery or laborers to repair the rail seat. Furthermore, rail roads assembly's typically must be repaired on site in order to minimize the track down time. Thus, it would have been obvious to use a polyurethane material with a reasonable set time that would minimize track down time.

9. Regarding claims 7-10 and 17-20, the combination of Giorgini and Rhodes do not expressly teach: (1) wherein the rail ties having the restored rail seat maintains the gauge of a rail assembly under dynamic operating conditions; (2) wherein the modulus of the restored rail seat is increased to a level which will resist compressive loading and

maintain the rail gauge of the rail assembly; (3) wherein the Elongation of the restored rail seat is at least about 10%; and (4) wherein the Shore D (24 hour) Hardness of the restored rail seat is at least about 65.

m. However, Rhodes teaches that Polyurethane is capable of with standing temperatures up to 300 F, which exceeds the maximum temperature that a railroad would typically see. On the other end, low temperature properties of polyurethane are stable. Therefore, repairing a rail assembly with polyurethane would lead to a rail assembly system that does not deform or fatigue due to temperature or pressure changes. **(See column 7 lines 23-32)**.

n. Additionally, Giorgini teaches that strength enhancers, hydrophobic enhancers, and impact absorption enhancers can be added to polyurethane to make a more stable repaired article. **(See abstract)**. Having better impact absorption will eliminate or minimize structural damages that may occur from railroad vibration or jolts and thus allow the rail assembly to preform under dynamic operating conditions.

o. Furthermore, one of ordinary skill in the art would have obviously recognized that the claimed properties of the restored rail seat would have naturally flowed from the claimed process and the claimed materials used in the claimed process. Since, Giorgini in view of Rhodes provides the same process and the same materials as the claimed invention, one of ordinary skill in the art would have obviously recognized, with all things being equal (process and

materials), that the process of Giorgini and Rhodes would have produced a restore rail seat having the claimed properties.

10. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giorgini et al (USP No. 7,138,437) in view of Rhodes et al. (USP No. 4,295,259) as evidenced by Young et al. (USP No. 5,173,222) in further view of Barth et al. (USP No. 4,275,172) or Markusch1 et al. (USP No. 5,166,303) or Markusch2 et al. (USP No. 5,607,998) or Markusch3 et al. (USP No. 6,786,680) in further view of AZOM (Polyurethanes – What Goes into Pu, Pages 1-6 (2003)) .

11. Regarding claims 22-24, Giorgini teaches wherein the polyurethane-urea mixture consists of at least one polyol compound, at least one isocyanate compound and an isocyanate.

p. **See abstract disclosing that the compositions include part A (polyols) and Part B (Isocyanates)**.

q. **See column 3 lines 35-49 disclosing that gelling agents such as polyamines can be used with part A (polyol) composition**.

r. **See column 5 lines 32-35 disclosing use as amines as catalyst**.

s. Giorgini does not expressly teach wherein the polyol is a hydroxyl capped polyol and the amine is a polyether capped.

vi. However, Giorgini teaches wherein the polyurethane composition can include extenders. **(See column 8 lines 4-11)**. Giorgini goes on to

teach wherein the hydroxyl number for the polyol is between 14-1800. **(See column 2 line 65 to column 3 line 5)**.

vii. Chain extenders are reactive low molecular weight di-functional compounds such as hydroxyl amines, glycols or diamines and are used to influence the end properties of polyurethane. The chain-extender reacts with the isocyanate to affect the hard/soft segment relationship and therefore the modulus and glass transition temperature (Tg) of the polymer. The Tg provides a measure of the polymer's softening point and some indication of the safe upper limit of its working temperature range. **(See Azom page 4- Chain Extenders)**

(2) In this case, it would have been obvious for one having the ordinary skill in the art to alter the Tg and modulus of the polyurethane to alter the sag relationship and curing capability of the polyurethane.

Response to Arguments

2. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMJAD ABRAHAM whose telephone number is (571)270-7058. The examiner can normally be reached on Monday through Friday 8:00 AM to 5:00 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on (571) 272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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